HELENA LABORATORIES

ELECTRONIC DIVISION

STANDARD OPERATING INSTRUCTIONS

TITLE: SPIFE 3000 CALIB AND TEST INSTRUCTIONS	PROCEDURE #: 8R500211	REVISION: W	EFFECTIVE DATE
ORIGINATOR/DEPT. MGR. DATE: H. GARSEE	ORIG. DEPT. MGR. DATE:		PAGE 1 OF 43 LAST ECN #
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1.0 **OUTLINE:**

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2.0 **DEPARTMENTAL DISTRIBUTION:**

Electronic Production
Electronic Q.A.
Electronic Customer Service

3.0 **SCOPE:**

Insure the proper alignment and function of the SPIFE 3000.

4.0 **RELATED DOCUMENTS:**

Operators Manual	D6500090
Exposure Control Plan	S.O.I. 14-0058
MRA & Verification Procedure	8R690007
Unitech MS260/MS265 Hand Held CCD Scanner User's Manual.	
Overall Wiring	8EM54101
Assy., Final, 110V	8IE54101
Assy., Chamber SPIFE	8IE54102
Schematic, PCB, Incubator	8EP54001

Assy., PCB, Incubator	8FP54001
Schematic, SPIFE Electro P/S	8EP54110
Assy., SPIFE Electro P/S	8FP54110
Schematic, TEC Power Supply	8EP32004
Assy., PCB TEC P/S	8FP32004
Schematic,Oneshot PCB	8EP32011
Assy., Oneshot PCB	8FP32011
Schematic, Switches	8EP32001
Assy., Switches	8FP32001
Schematic, PCB, Heater Control	8EP32007
Assembly Drawing	8FP32007
Schematic, PCB, Filter, EMI	8EP00052
Assembly Drawing	8FP54106
Schematic, App. Interface PCB	8EP54101
Assy., App. Interface	8FP54101
Schematic, PCB, Spife Stainer Control	8EP54112
Assembly Drawing	8FP54002
Leakage Current Procedure	8R700021

5.0 **RELATED EQUIPMENT**:

Dummy load for calibration of Ep.Supply	8JE34010
Heat load test fixture	8JE00023
Rep Prep	Cat.No. 3100
Aluminum. foil tape 1/2"	9T020018
Serum Protein 60 Sample Tray	81540028
Applicator Blades	Cat. No. 3369
Brown Reagent bottle	
Tool Applicator Blade alignment	81541037
Template Blade alignment	81541038
Fluke Model 77 Digital Multimeter or Equiv.	
Fluke Model 51 Digital Temperature Meter.	
1 ea. 30 sample REP gel blank (clear)	9P440003
1 ea. Assembly Spife Shorting Plug	8JE32010
1 ea. HyPot (Associated Research)	Model #4045A1 or Equiv.
5 ea. 32oz. Container	86000129
1ea. 128oz. Container	86000128
Rep, prepper (small squeeze bulb)	F1359000

6.0 **DEFINITIONS:**

LCD: Liquid Crystal Display
DVM: Digital Volt Meter
TP: Test Point

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7.0 **PROCEDURE**: Incubator

NOTE: ALL MEASUREMENTS, ERRORS, OR EXCEPTIONS TO THE FOLLOWING PROCEDURE SHOULD BE ENTERED INTO THE INSTRUMENT HISTORY FOLDER OR CHECK OFF SHEET.

NOTE: The keys are labeled START/STOP and TEST SELECT/CONTINUE. This document will refer to these two keys as S/S and TS/C respectively.

The Test and Calibration Menu may be entered by two means, automatically at power up if any of the calibration constants are corrupted, or manually at power up if both keys are pressed until the display is initialized then released and the S/S pressed again. A prompt will be displayed instructing that QUALIFIED SERVICE PERSONNEL are to press (start) this will cause the menu to be presented. Press and release TS/C key to step through the menu. The menu is as follows:

CALIBRATE HI VOLT SUPPLY
TEST HI VOLT LINEARITY
CALIBRATE CHAMBER TEMP
TEST CHAMBER TEMP. LINEARITY
TEST THERMOSTAT
BUFFALO (This is for software development only)
BURN-IN TEST
TEST APPLICATOR DRIVE
CALIBRATE APPLICATOR
TEST DWELL TIMES
TEST BAR CODE READER
TEST DETECTOR SWITCHES
CALIBRATE REAGENT DETECTOR
RETURN TO MAIN PROGRAM

The Operator Options Menu may be entered at power up if both keys are pressed until the display is initialized then released. This will cause the menu to be presented. Press and release TS/C key to step through the menu. The menu is as follows:

LANGUAGE, LANGUE, SPRACHE, LEGUAJE
SET PARAMETERS TO DEFAULT
ADJUST ALARM VOLUME
ENABLE/DISABLE KEY BEEP
ENABLE/DISABLE POSITIVE PATIENT ID
ENABLE/DISABLE REAGENT DETECT
RETURN TO MAIN PROGRAM

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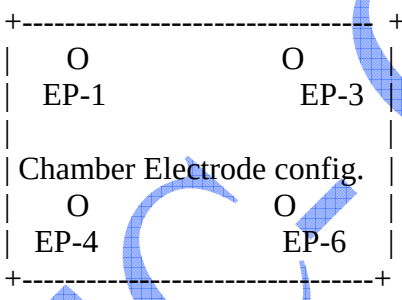
7.1 Align and level Chamber:

1) Turn power off. Loosen the four Chamber mounting screws. Insure that the Chamber is able to move freely in both axis.
2) Push chamber the left most position.
3) Tighten the Chamber mounting screws.
4) Begin with the two level adjustment feet screwed into the chassis.
5) Place a Bubble Level in the center of the Chamber floor.
6) Adjust the two level adjustment feet as necessary to cause the bubble to center within the target.

7.2 Electrophoresis Interlock test:

1) Before power is applied test to insure all high voltage safety devices are functioning, with the Chamber Lid open, using an Ohmmeter meter as follows:

Connections
J201-10 to IL1-1 (+ HV)
J201-14 to IL2-1 (- HV)
IL1-2 to EP-1 and EP-4 (+ HV)
IL2-2 to EP-3 and EP-6 (- HV)



No connections
J201-10 to IL1-2 or IL2-2
J201-14 to IL1-2 or IL2-2

2) Using an Ohmmeter meter insure that J201-11 is connected to the Red banana jack on the rear panel and that J201-15 is connected to the Black banana jack also on the rear panel.
3) Measure continuity between J1-12 and J1-23 of the Controller PCB, with switch S2 in the released position there should be no continuity, with the switch depressed there should be continuity.
4) Measure continuity between J202-1 of the EP Supply and J1-14 of the Controller PCB, with switch S2 in the released position there should be no continuity, with the switch depressed there should be continuity.

Important: Fill stainer chamber with D.I. water prior to applying power. Connect each port (1-3, 5, 7) to a 32oz. container (86000129). Connect the waste port (4) to a 128oz. container.

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7.3 Hypot and Continuity Test:

1) Remove the two screws securing the AC receptacle and pull the receptacle through the rear panel. Remove the MOV leads from the AC line terminals. Install a power cord in the AC receptacle. Insure that the HYPOT selector is set to OFF and that the output voltage control is set to MIN, maximum CCW.
Connect the HYPOT to the instrument as follows:
Black lead, labeled RETURN, to the chassis ground.
White lead, labeled DC HIGH VOLTAGE, to the Hi and Low pins of the power cord.
Apply power to the HYPOT, set the selector to DC and adjust the output voltage control to two Kilovolts for two seconds. There must be no indication of Leakage or Breakdown. Return the HYPOT output control to MIN and set the selector to OFF. Disconnect the HYPOT and reinstall the MOV leads and the AC receptacle.

2) Using an ohmmeter check to insure that there is continuity between any unfinished metal which is exposed once the instrument cover is installed and the ground terminal of the power cord. This does not include the Gel Holder for the Stainer.

3) With P2 connected to the power supply, using an Ohmmeter insure that P2-4 and P2-5 are connected to the chassis, and that these five voltages are not shorted together or to the chassis.
P2-1 and P2-2 (+5 volts)
P2-11 (-12 volts)
P2-8 (+12 volts)
P2-13 (-5 volts)

4) Again using an Ohmmeter insures that TB3-3,-4 and -5 are connected to the chassis and that terminals:
TB3-1 and TB3-2 (+24 volts) are not shorted to chassis and that:
TB3-6 (AC line neutral)
TB3-7 (AC line hot)
are not shorted together or to the chassis

7.4 Power Supply Voltage Test:

Plug in Power Cord and turn on the Main Power Switch, with the common lead of the DVM to Power Supply Common TB1-6, make the following voltage measurements at TB1, and TB3
TB1-7 +5 volts ± .25
TB3-1 +24 volts ± 1.2
TB1-8 +12 volts ± .6
TB1-9 -12 volts ± .6
TB1-10 -5 volts ±.2

Note: Measurements made on PCB, Stainer Control (8JP54105)

1) Measure and record the voltage from TP-9, (+) to TP-20 (-).
Insure it is +5.0 volts +/- 5% (0.25 volts).
2) Measure and record the voltage from TP-6, (+) to TP-20 (-).

Insure it is +12.0 volts +/- 3% (.36 volts)

3) Measure and record the voltage from TP-8 (+) to TP-20 (-).
Insure it is -5.0 volts +/- 5 % (0.25 volt).

4) Measure and record the voltage from TP-7 (+) to TP-20 (-).
Insure it is -12.0 volts +/- 3 % (.36 volts).

Note: Measurements made on PCB, Incubator Control (8JP54104)

5) Measure and record the voltage from P6-5 and P6-6 (+), to P6-8 (-).
Insure it is +5.0 volts +/- 5% (0.25 volts).

6) Measure and record the voltage from P6-1 (+), to P6-8 (-).
Insure it is +12.0 volts +/- 3% (.36 volts)

7) Measure and record the voltage from P6-3 (+), to P6-8 (-).
Insure it is -5.0 volts +/- 5 % (0.25 volt).

8) Measure and record the voltage from P6-4 (+), to P6-8 (-).
Insure it is -12.0 volts +/- 3 % (.36 volts).

9) Turn off the Main Power Switch.

7.5 Calibration and Test EP. Supply:

NOTE: **The hinged Lid which covers the Electrophoresis Chamber actuates a dual high voltage interlock which will disconnect the EP. Supply from the Electrode posts within the Electrophoresis Chamber and a switch which will disable the EP. Supply when the Lid is raised, HOWEVER the Red and Black banana jacks located on the rear chassis are NOT disconnected from the Electrophoresis Supply when the Lid is opened.**

NOTE: When calibrating the Electrophoresis Power Supply, whenever the display prompts to change the Dummy Calibration Load configuration the EP Supply will be disabled, however for the sake of SAFETY it is recommend that:

1) The Chamber Lid is opened to insure the EP. Supply is disabled.
2) The DVM must be observed to insure that the voltage is at a SAFE level before touching the test leads connected to the Dummy Load or the SPIFE banana jacks.

1) Turn on the Main Power Switch; because a new microprocessor EPROM will not have calibration constants stored the machine will report the calibration error. Enter the keys as prompted to access the Test and Calibration Menu.

2) Using the TS/C key scroll through the options until CALIBRATE HI VOLT SUPPLY is displayed, press the S/S key. If this is not the first calibration then the option to restore is presented. If so, decline by pressing S/S. The display will prompt to connect the Calb. Load and press (continue) when completed.

3) Connect the EP SUPPLY CALIBRATION DUMMY LOAD to the Red and Black Banana plugs on the rear chassis, connect the DVM to the DUMMY LOAD, and configure all test leads for VOLTAGE in accordance with the labeling on the DUMMY LOAD. Press the indicated key to continue. Insure that both of the fans which cool the EP. Supplies are blowing air across the supply PCB.

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4) The target voltage to which the supply is to be set will be displayed (along with the current D to A value) , adjust the EP Supply output voltage measured by the DVM (Note the DVM will indicate 1/10 of the actual voltage output) , use the TS/C key to decrease, or the S/S key to increase the value.

5) Once the DVM reading is correct, while watching the D to A reading to insure it is not accidentally altered, simultaneously depress both keys to indicate the low calibration is completed.

6) The EP Supply will then be automatically programmed to a higher output voltage.

7) Again the target voltage to which the supply is to be set will be displayed (along with the current D to A value), adjust the EP Supply output voltage measured by the DVM (Note the DVM will indicate 1/10 of the actual voltage output) , use the TS/C key to decrease, or the S/S key to increase the value.

8) Once the DVM reading is correct, while watching the D to A reading to insure it is not accidentally altered, simultaneously depress both keys to indicate the high calibration is completed.

9) The EP Supply will be disabled and the operator prompted to reconfigure the Dummy Load and DVM for current measurement. The DVM must be set to measure 300 mA.

10) Again press the indicated key to continue. Calibrate the EP Supply current in the same manner as the voltage calibration.
Note: When calibrating the Electrophoresis Current Monitor at the lower end (15 mA.) adjust the D/A to cause the external ampmeter to read on the high side of 15 mA.

11) (Test of restoration of Calibration will be verified in the next steps where linearity is tested after restoration).
Re-select CALIBRATE HI VOLT SUPPLY, this time the options to restore the calibration of both volts and current are presented, press TS/C to restore each when the option is presented.

12) The display will return to the selection menu, select Test HI VOLT LINEARITY.

13) Configure the Dummy Load for voltage measurement, insert a second DVM, set to measure 300mA, in series between the input red jack of the Dummy load and the red banana jack on the rear panel, once the load is connected press TS/C record the voltage and current values of the display and DVMs using the Record sheet provided in this instruction. (Note the DVM will indicate 1/10 of the actual voltage output. Multiply DVM reading by 10 to get actual voltage.) Press TS/C after each measurement to cause the next value to be displayed. This record is to be retained as evidence for the History folder.
Note : The current at 100 Volts out should be no greater than 2 mA maximum if not so return to Electrophoresis Current Monitor calibration and set the D/A at the lower end (15 mA.) so that the external current meter reads higher than previously calibrated.

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7.6 Calibration and Test of TECs Supply:

1) Enter the Test and Calibration Menu. Using thermal compound and aluminum tape secure the temperature meter to the Chamber floor in a manner that insures good thermal contact between the sensor and the Chamber floor, paper towels rolled and place over the sensor and a test chamber lid may be installed to both insulate and force the sensor into intimate contact with the chamber floor.
2) Using the TS/C key scroll through the options until CALIBRATE CHAMBER TEMP. is displayed, press the S/S key. Again if this is not the first calibration then the option to restore will be presented, decline by pressing S/S.
3) Insure that both of the fans which cool the TEC Supply are blowing air across the supply PCB.
4) The target temperature to which the chamber is to be driven will be displayed (along with the current D to A value) ,always allow sufficient time for the temperature to stabilize before making adjustments. Once the temperature as indicated by the attached temperature meter has stabilized adjust the temperature to the target value use the TS/C key to decrease or the S/S key to increase the temperature.
5) Once the temperature meter reading is stable and correct, while watching the D to A reading to insure it is not accidentally altered, simultaneously depress both keys to indicate the low calibration is completed.
6) The TEC Supply will then be automatically programmed to a higher temperature.
7) Again the target temperature to which the chamber is to be driven will be displayed (along with the current D to A value) , allow the temperature to stabilize adjust the temperature to the target value use the TS/C key to decrease, or the S/S key to increase the value.
8) Once the temperature meter reading is stable and correct, while watching the D to A reading to insure it is not accidentally altered, simultaneously depress both keys to indicate the high calibration is completed.
9) The TEC Supply programmed temperature will be set to near ambient.
10) (Test of restoration of Calibration will be verified in the next steps where linearity is tested after restoration).Re-select CALIBRATE CHAMBER TEMP, this time the option to restore the calibration is presented, press TS/C to restore when the option is presented.
11) The display will return to the selection menu, select TEST CHAMBER TEMP. LINEARITY.
12) Record the measurements required on the Record sheet provided with this instruction. Allow temperature to stabilize before taking reading, Press TS/C key to cause the next temperature to be programmed. This Record is to be retained as evidence for the History folder.
13) The display will return to the selection menu

7.7 Thermostat test:

NOTE If during the test the temperature exceeds 92 degrees turn off the instrument repair and re-test.

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1) The temperature meter should be attached to the chamber floor as it was during calibration. Select TEST THERMOSTAT.
2) The chamber temperature will be set to 20 degrees for approximately 10 seconds. The temperature will next be set to 62 degrees for approximately60 seconds. The thermostat MUST NOT trip during this test.
3) The chamber temperature will again be set to 20 degrees for approximately 10 seconds. The temperature will next be set to the maximum programmable value to cause the thermostat to be tripped. It may be necessary to short out the Temperature Sensor at this time to cause the thermostat to be tripped. The software will monitor the TEC current to determine the time at which the current flow is stopped. The alarm is sounded to notify the technician to record the TRIP temperature.
4) The software will continue to monitor the TEC current to determine the time at which the current flow starts. The alarm is sounded to notify the technician to record the RESET temperature.
5) The chamber temperature is set to the Standby temperature, 21 degrees and the display will return to the selection menu

7.8 Calibrate the Reagent Detector:

1) Select the CALIBRATE REAGENT DETECTOR option. This will cause the Reagent Bottle Detector threshold voltage to be determined. The display appears as follows:
'REMOVE REAGENT)(continue) TO CONTINUE'
If the lid is closed the alarm will sound. Remove the Reagent bottle and press the TS/C key.
'BOTTLE (OUT) (IN) CALIBRATION VALUE'
' ddd 0 0 '
The D/A (OUT) value is displayed while being adjusted to be equal to the voltage out of the detector for no bottle installed.
2) When the adjustment is completed the display appear as follows:
'INSTALL REAGENT (continue) TO CONTINUE'
Install a brown Reagent bottle which has a label, in the rear position on the reagent dump bar and press TS/C.
The D/A (IN) value is displayed while being adjusted to be equal to the voltage out of the detector for bottle installed.
'BOTTLE (OUT) (IN) CALIBRATION VALUE'
' ddd ddd 0 '
3) Once the D/A adjustment is completed the display will appear as follows:
'BOTTLE (OUT) (IN) CALIBRATION VALUE'
' ddd ddd ddd
Record values on record sheet provided. '
The CALIBRATION VALUE will be determined to be midway between the OUT and IN values. Press any key to return to the selection menu.

7.9 Test Detector switches:

1) Select the TEST DETECTOR SWITCHES option.

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This test will cause the real time status of the Applicator position detector switches to be displayed as follows:

'(AP UP DN) (SD LF RT) (RG UP DN) (BOTTLE)''

d d d d d d d '

Where d is a 0 or 1, the logical state of the detector.

2) Test Applicator Detectors
When the Applicator Home Detector Switch is closed AP UP = 0
When the Applicator Home Detector Switch is open AP UP = 1
When the Applicator Position Detector Switch is closed AP DN = 1
When the Applicator Position Detector Switch is open AP DN = 0

3) Test Sled Detectors.
When the Sled Home Detector Switch is closed SD LF = 0
When the Sled Home Detector Switch is open SD LF = 1
When the Sled Position Detector Switch is closed SD RT = 0
When the Sled Position Detector Switch is open SD RT = 1

4) Test Reagent Detectors.
When the Reagent Bar is up RG UP = 0
When the Reagent Bar is up RG DN = 1
When the Reagent Bar is down RG UP = 1
When the Reagent Bar is down RG DN = 0

5) Test Reagent Bottle Detector.
When bottle is installed BOTTLE = 1
When bottle is not installed BOTTLE = 0
Press both keys to return to the selection menu.

7.10 Calibration of Applicator:

1) **Adjust the Applicator Home Detector Switch Actuator.**
Select the TEST DETECTOR SWITCHES test option to display the status of the Applicator Up switch. Initially adjust the Applicator Home Detector Switch Actuator so that the switch is not actuated (AP UP =1) when the Applicator is manually raised to the mechanical stop. Lower the Applicator and adjust the actuator CCW one turn. Again raise the applicator to the mechanical stop, check to determine if the switch has been actuated (AP UP = 0) if not continue this procedure turning the actuator screw one turn only each adjustment until the switch is actuated.
Once this is accomplished adjust the actuator two full turns CCW and apply glyptal to the actuator to secure the adjustment.

2) **Adjust the Sled and Applicator Speeds.**
Carefully push the Applicator to the bottom most position. Initially position the optical interrupter flag, (Applicator Position adjustment), slightly below the optical detector, the LED on the optical detector will indicate when the flag goes below the detector window Note it is important that the optical interrupter flag be parallel to the optical detector window so that the speed calibration is performed using a known distance of travel. Once this adjustment is completed return the Applicator to position 0.
Select and execute the CALIBRATE APPLICATOR option.
The display option is as follows:

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'CALB.=(start) TEST=(cont.) QUIT=(both)'
' *'*

Pressing the S/S key, selecting Auto Calibrate, will cause the following warning to be displayed.
'WARNING SLED/APPLICATOR WILL MOVE'
'PRESS ANY KEY TO CONTINUE'
During the calibration the display will appear as follows:
TARGET t.ttt (or) tt.tt SLED(or) APPLICATOR SPEED #s
ELAPSE TIME = d.ddd (or) dd.dd SECS. D/A = bbb
Where t.ttt (or) tt.tt represents the target run time for the speed currently being adjusted.
Where #s represent the speed number currently being adjusted.
Where t.ttt d.ddd (or) dd.dd represents the test run time using the D/A bits indicated.
Where bbb represents the D/A bits currently being tested.
The software will determine the D/A bits necessary for the Sled speeds one and two and the Applicator speeds one through seven.
The software will determine the duty cycle necessary for the PWM speed control for Applicator speed number eight.
These values will be stored in EEPROM.
The display will return to the initial option.
'CALB.=(start) TEST=(cont.) QUIT=(both)'
' *'*

Pressing the TS/C key, selecting Test Calibration, will cause the following warning to be displayed.
'WARNING SLED/APPLICATOR WILL MOVE'
'PRESS ANY KEY TO CONTINUE'
As each speed of both the Sled and the Applicator are tested the instrument will pause displaying the results in the same format as described during calibration. Record all D/A and calibration speeds using the record sheet included. Press either key to cause the next speed to be tested. Finally when the last speed is tested press either key the display will return to the original option, *'CALB.=(start) TEST=(cont.) QUIT=(both)'*
Pressing both keys simultaneously at this time will cause calibration to end and the display to return to the next item of the Test and Calibration Menu.

7.11 Align, Adjust and Test Applicator, Sled and Reagent Drives:
NOTE The operation of the TEST APPLICATOR DRIVE is as follows: Selecting the option will cause the Applicator, Reagent Bar and Sled to be initialized, in that order and the display to present the option:

'(start)SELECT (continue) NEXT (both) QUIT'
' SLED
Pressing TS/C will cause the drive option on the lower line to scroll through APPLICATOR, REAGENT and back to SLED.
Pressing both keys simultaneously will end the test of the Applicator Drives.
Select for test the drive whose name is displayed on the lower line by pressing S/S, causing the display to present the option:

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'(start)RUN (continue) NEXT (both) QUIT'
' MOVE TO POSITION d'
Pressing S/S will cause a move to be made by the selected drive to the 'MOVE TO POSITION d ' indicate.
Pressing TS/C will cause the selected target position, "d", to be advanced through it's range and return to zero.
Pressing both keys simultaneously will cause the display to present the previous options.

1) **Adjust the Applicator Position Detector.**
Note it is important that the optical interrupter flag be parallel to the optical detector window so that the relationship of applicator position number 1 and 2 are correct .Install applicator blades in slots 1 and 16.Execute the TEST APPLICATOR DRIVE test.
Select the SLED drive and command the Sled to move to position 5.Select the APPLICATOR drive and command the Applicator to move to position 2, Sample load/apply position. Repeatedly pressing S/S will cause the Applicator to be raised to the Home position then driven down to position 2. Adjust the optical interrupter flag, (Applicator Position adjustment) as necessary so that when the Applicator is driven to position 2 the Blades are both touching the Chamber floor, and that the Blade in slot #1 is lifted approximately .05" above the holder. All blades should be in contact with the chamber floor, if not refer to the assembly adjustments instruction.
Press and release both keys simultaneously until display returns to the beginning of the Test and Calibration Menu.

2) **Pre Set the Applicator Blade Holder Frame (ABHF)**
Install Applicator Blades in slots 1 and 16. Position the Sled over Chamber floor. Carefully push the ABHF down observing the blades as they contact the Chamber Floor. The Blades should be parallel to the Chamber floor, if not loosen the three screws on the left bottom of the Sled and adjust the ABHF so that the blades are parallel to the Chamber Floor front to rear. Center the ABHF within the adjustment range by loosening the four screws which secure the ABHF, completely removing the pair at the right so that the threaded hole may be seen through the larger hole. Move the ABHF as necessary to cause the threaded holes to be centered within the larger holes. Tighten the two screws at the left and install and tighten the two screws at the right.

3) **Adjust Reagent Spreader Forks**.
Select the APPLICATOR drive and command the Applicator to move to position 1, Reagent spread position. Repeatedly pressing S/S will cause the Applicator to be raised to the Home position then driven down to position 1. Use a 1/8 inch gauge block to adjust the clearance of both of the spreader forks to the chamber floor while the Applicator is at position number 1.

4) **Adjust the Sled Home Detector Switch.**
Select the SLED drive and command the Sled to move to position 8 then to position 0, (Home position). Repeat these drive command as necessary adjusting the position of the Home Detector Switch located on the left side

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of the Sled, so that when the Sled is driven to position 0 the left side of the Sled is approximately at the right side of the High voltage interlock cover.

5) **Adjust the Sled Position Detector Switch.**

NOTE: This switch is located at the right of the Sled. The height of the detector switch is critical. If the switch is low drive failure may occur during Reagent Spreading. If the switch is high all of the detents may not be detected, resulting in position errors.

Install the Template Blade Alignment (81541038) in the sample tray location. Install the Tool Applicator blade alignment (81541037) in Applicator Blade slot #2.Select the SLED drive and command the Sled to move right to position 5.Command the Sled to move to the left to position 1, (Sample Load position). Select the APPLICATOR drive and command the Applicator to drive down to position 2, (Sample Apply position).Repeat these drive command as necessary adjusting the Sled Position Detector Switch so that when the Sled is driven to the left and the Applicator is driven down both pins of the Alignment Tool Blade engage the holes at the left of the Blade Alignment Template. After the adjustment has been made check the switch height adjustment by means of selecting TEST DETECTOR SWITCHES, carefully manually moving the Sled to the built-in step gauge which is located on the Détente Bar past position number 8. The switch should not indicate closed on the first step (.05”) but should indicate closed on the second step (.075”), if not so, repeat the adjustment as necessary to satisfy all of the conditions stated

Once this adjustment has been made install the Sled Cover and repeat the previous steps. If the alignment is not correct the Applicator Blade Holder Frame may be adjusted by loosening the four screws which secure the ABHF, repositioning it as necessary and rescuing the four screws loosened. Once the adjustment is made move the Alignment Tool Blade position #14 and insure that both pins of the Alignment Tool Blade engage the holes at the right of the Blade Alignment Template, if not readjust as necessary to satisfy all of the conditions stated.

6) **Test the Sled Position Drive.**

Select SLED drive. Command the Sled to be driven to each of the 8 possible positions. Note that when the Sled stops the roller of the detector switch is at the approximate center of the detente wedge.

Note that except for the Home position any command to drive from the right to the left will cause the Sled to slightly over drive the detente and then reverse and approach finally from left to right. Note that commanding the sled to drive to Position #1, Sample Load

Position, from any position will cause the sled to be driven first to the Home Position, Position #0, then to Position #1.

Note that if the move is relatively long the Sled will be driven at high speed initially then will slow to make the final approach. If the move is relatively short the complete move will be made at the slow speed.

7) **Test the Reagent Drive.**

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Select REAGENT drive and commanding the Reagent to move to position 0, (up right position). Note that the Reagent Bar is driven slightly out of the Home detector and the back in. Command the Reagent to move to position 1. Note that the reagent Bar is turned so that the Reagent would be emptied .Command the Regent to drive back to position 0. Bar returns to up right position.
To end testing press and release both keys until the display returns tofirst of the Test and Calibration Menu.

7.12 Test Dwell Times:

1. Selecting this test will cause the Sled to be driven from the Home position at the left through the 8th detent position at speed #1, measuring the time intervals that the detector switch was closed on each detente.
2. Record each of the measurements as well as the total elapse time displayed on the sheet provided in this procedure.

7.13 Test of Bar Code Reader:

1) Select and execute the TEST BAR CODE OPTION.
2) Insure that Bar Code gun has been programmed 8R640101.
3) Scan the Bar Code in Appendix A (G01013).
4) The displayed results should be as follows:
   12 34 F0 12 45 16 45 16 26 5A
5) Press the S/S key to end test.

7.14 Test of Parameter Editing:

NOTE: The test parameters are edited as follows:

To edit a test using the TS/C key select the test to edit.
Press both keys simultaneously.
The option to READ or to EDIT the test parameters.
If EDIT is selected the first operation is displayed.
To perform no edit step to the next operation by pressing either keyless than ½ second.
To perform edit press and hold either key for more than ½ sec. (a beep will be heard)
The underscore will indicate the parameter currently available to modify.
The underscore may be moved forward through the parameter list by pressing the TS/C key for more than ½ sec.
The underscore may be moved backwards through the parameter list by pressing the S/S key for more than ½ sec.
To increase the parameter indicated by the underscore press the S/S key for less than ½ sec.
To decrease the parameter indicated by the underscore press the TS/C key for less than ½ sec.
To terminate edit of an operation of a test move the underscore to the last parameter of the bottom line of the display, (right side of the display) and press and hold the TS/C key for more than ½ sec.

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Up to 50 steps may be programmed. The edits will end when 50 step are programmed or when the END OF TEST is selected and the TS/C key is pressed for more than 1/2 second.

1) Close the lid and enter the main program, if parameters are corrupt an error is reported and pressing either key will causes the parameters to be presented for editing, if the parameters are not corrupted, select SERUM PROTEIN and press both keys to edit.
Test to insure that the following prompts may be selected:
NO PROMPT
REMOVE GEL BLKS, APPLY ANTISERA, (continue)
INSTALL BLOTTER, (continue)
REMOVE BLOTTER, (continue)
TO CONTINUE, (continue)
REMOVE EXCESS ANTISERA, (continue)
REMOVE GEL BLOCKS, (continue)
REMOVE TEMPLATE,INSTALL BLOT.(continue)
APPLY SAMPLE TO TEMPLATE, (continue)
BLOT AND REMOVE TEMPLATE, (continue)

2) Select NO PROMPT
Test to insure that the following operations may be selected:
LOAD SAMPLE
PAUSE
APPLY SAMPLE
ELECTROPHORESIS
APPLY REAGENT
ABSORB
BLOT
INCUBATE
DRY
END OF TEST

3) Select ELECTROPHORESIS
Test to insure time is programmable in the following range:
The maximum time is 99:59.
The minimum time is: 01.
Set to maximum

4) Test to insure temperature is programmable in the following range:
The maximum temperature is 62 degrees C.
The minimum is 10 degrees C.
Set to maximum.

5) Test to insure voltage is programmable in the following range:
The maximum voltage is 1300 volts and the minimum voltage is 100 volts.
Set to maximum.

6) Test to insure Current limit is programmable in the following range:
The maximum current is 300 mA and the minimum current is 3mA
Set to maximum.

7) Select Apply Sample
Test to insure LOC is programmable in the following range:

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The maximum location is 2
The minimum location is 1
Set to maximum. Select next operation as END OF TEST

8) Turn the power off delay then turn the power on check to verify that the parameters of SERUM PROTEIN are as they were programmed.

9) Repeat steps 1 through 8 this time program time, temperature, volts and current to their minimum values, turn power off and then on, verify that values programmed are unchanged.

7.15 Fan Test

1) Enter the main menu
2) Press both the Start and Select buttons at the same time to enter the Read/Edit menu of the Serum Protein Test.
3) Select Edit.
4) Using the Start and Select buttons program the following:

No Prompt

Dry :20 54° C

No Prompt
End Test

5) Press the start button
6) Verify that the cooling fan (mounted adjacent to the 8JP54101 board) starts when the chamber reaches the programmed temperature.
7) Press the select button when the test is completed.

7.16 Test select display language option.

NOTE To access the Operator Options Menu, turn off power, press both keys, apply power, and once the display is initialized release the keys.

1) Using the TS/C keys verifies that the menu includes the following:
LANGUAGE, LANGUE, SPRACHE, LENGUAJE
SET PARAMETERS TO DEFAULT
ADJUST ALARM VOLUME
ENABLE/DISABLE KEY BEEP
ENABLE/DISABLE POSITIVE PATIENT ID
ENABLE/DISABLE REAGENT DETECT
RETURN TO MAIN PROGRAM
2) Select and execute the LANGUAGE, LANGUE, SPRACHE, LENGUAJE option.
3) The bottom line of the display will appear as follows:
ENGLISH FRANCAIS DEUTSCH ESPANOL
With the cursor blinking at the selected language.
4) Press either key to cause the cursor to move indicating the current choice.
5) Pressing both keys simultaneously will cause the language indicated to be set as the choice for displaying the Operator messages, not the Technical messages.

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7.17 Test SET PARAMETERS TO DEFAULT option.

1) Select and execute SET PARAMETERS TO DEFAULT. For each test name the display will appear as follows:

'TEST NAME'

'(start)DISABLE OR (continue)ENABLE TEST'

2) Enter TS/C to enable the test.
The display then reads:

'TEST NAME'

'(start)NO CHANGE (continue)SET TO DEFAULT'

3) Enter TS/C to set the test to default values.
Repeat this enabling and set to default all tests.

7.18 Test ADJUST ALARM VOLUME option.

1) Enter the Operator Option Menu. Select ADJUST ALARM VOLUME
The display is as follows:

'(ss)â (ts/c) áQUIT (both)'

' d'

Where d is a value in the range of 1 to 36.
The alarm volume is adjusted by pressing the S/S key to decrease the volume or the TS/C key to increase the volume. Releasing the keys will cause the current selection to be demonstrated. Cycle through the volume range verifying that each numeric change results in volume change. Set the volume to midrange (18). The selected value will be stored in EEPROM when both keys are pressed simultaneously. The selection will end and the display will return to the next item of the Operator Selections. Select the ENABLE/DISABLE POSITIVE PATIENT ID option and set it ON.

2) Return to main program and start a run.
'BAR CODES DO NOT MATCH, PRESS (continue)' is reported in and the Alarm occurs.

3) Notice that the Alarm Volume is minimum. Press the TS/C key to clear the error.

7.19 Test ENABLE/DISABLE KEY BEEP option.

1) Enter the Operator Option Menu. Select the ENABLE/DISABLE KEY BEEP option and set it ON. Verify that the Beeper sounds when a key is pressed.

2) Again enter the Operator Option Menu. Select the ENABLE/DISABLE KEY BEEP option and set it OFF. Verify that the Beeper does not sound when a key is pressed.

7.20 Test ENABLE/DISABLE POSITIVE PATIENT ID option.

1) Enter Operator Option Menu.
Select the ENABLE/DISABLE POSITIVE PATIENT ID option and set it ON. Enter the main program and verify that when a test is started an error occurs indicating that the BAR CODES DO NOT MATCH, PRESS (continue). Press TS/C.

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2) Open the lid, scan the bar code G10000 and T10000 in Appendix A. Close the lid start a test and verify that the previous error does not occur.

3) Again enter Operator Option Menu.
Select the ENABLE/DISABLE POSITIVE PATIENT ID option and set it OFF. Enter the main program, do not scan the bar codes, start a test and verify that the previous error does not occur.

7.21 Test ENABLE/DISABLE REAGENT DETECT option.

1) Enter Operator Option Menu.
Select the ENABLE/DISABLE REAGENT DETECT option and set it ON. Install a Reagent bottle and enter the main program. Verify that the display will appear as follows:
'INITIALIZING'
'REMOVE REAGENT (continue) TO CONTINUE'
Don't remove bottle, press TS/C. Verify that the previous message continues to be displayed.
Remove the bottle, press TS/C. Verify that the previous message is cleared from the display.

2) Again enter Operator Option Menu.
Select the ENABLE/DISABLE REAGENT DETECT option and set it OFF. Install a Reagent bottle and enter the main program. Verify that the prompt to remove the reagent does not occur.

7.22 Heat Load Test:

1) Place shell enclosure on Spife and tighten cover hardware.
Apply an even coat of Rep Prep to the Chamber Floor.

2) Place the Heat Load in the center of the floor, attach the temperature probe to the center of the Heat Load using heat sink compound. Install packing on top of the Heat Load to assure a good thermal contact with the Chamber Floor. Partially close the test Chamber Lid, being careful not to damage any of the cables. Connect the Heat Load to the Variac. The Variac should be off and adjusted to output 120VAC.

3) Test to insure that the T.E.C. supply is configured for the correct line voltage by insuring that when the chamber is initially programmed to drive to 10 degrees that the “COOL” value displayed reaches a minimum of 8.5, indication the amount of current being drawn. Record peak reading observed on the Heat Load Test sheet.

4) Enter the Test and Calibration Menu. Select TEST CHAMBER TEMP. LINEARITY. The Chamber temperature will be programmed to 10 degrees C.

5) Allow the Chamber temperature to stabilize at or near the 10 degree programmed, the temperature of the Heat Load will be approximately two degrees C higher than the Chamber temperature. Turn on the Variac applying 120VAC to the Heat Load. Using the form included in this instruction, record the initial meter and monitor temperatures and at one minute intervals for a period of ten minutes. Turn OFF the Variac.

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6) The Chamber is acceptable if the Heat Load temperature levels off after about six minutes at no more than 28.0 degrees C.
7) If the temperature continues to increase more than one degree in the last five minutes of the test rerun the test after checking the Heat Load position and thermal contact.
8) When the test has been successfully completed, allow the chamber to return to regulation at 10 degrees C repeat the test again recording a second set of measurements.
9) If the Chamber fails the second test the Chamber may be examined using the infrared camera to determine the defective area of the Chamber. Repair and re-test completely.
10) When the Chamber has passed both of the tests place the record in the History folder. Remove the Heat Load and clean the Chamber floor.
11) Press and release the TS/C key until the selection menu appears. The Chamber temperature will be programmed to near ambient.

7.23 EP Interlock Alignment:

1) Place shell enclosure on Spife and tighten cover hardware.
2) Open chamber lid, exposing the interlock PCB.
3) Mark both sides of interlock PCB with black dry-erase marker (HPN X1933871), taking care not to apply ink past ends of contact area.
4) Close chamber cover and reopen. Observe marked impressions on PCB left by interlock contacts.
5) If adjustment is required, either remove cover and align interlock switch for course adjustment or for fine adjustment, adjust interlock PCB on chamber cover to achieve alignment where all contacts are striking PCB well within contact area.
6) Repeat steps 1 through 5 until proper alignment is attained. After alignment is completed, clean PCB with alcohol.

8.0 Procedure: Stainer

NOTE: AS BEFORE THE KEY WHICH IS LABELED START/STOP WILL BE REFERRED TO AS THE S/S KEY AND THE KEY LABELED TEST SELECT/CONTINUE WILL BE REFERRED TO AS THE TS/C KEY THROUGHOUT THIS DOCUMENT.

8.1 Visual Inspection and Pretest Setup:

1) Inspect the A.C. wiring to insure there are no pinched nicked, or insecurely terminated wires. Insure all chassis ground connections are secure.
2) Insure the Dryer Assy. is correct for the line voltage to be used, 110/220 volt operation.
3) Verify the fuse rating and type are correct for the line voltage to be used.

8.2 Test of Test and Calibration Menu and Operator Options Menu.

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NOTE: The Test and Calibration Menu has been separated from the Operator Selection Menu.

1) As before the Test and Calibration Menu may be entered by two means; automatically at power up if any of the calibration constants are not valid, or manually if both keys are held down during power application until the display is initialized then released and press the S/S key. Enter the Test and Calibration Menu.
2) The display will read
   "QUALIFIED PERSONNEL PRESS (start) OTHERS PRESS(continue)TO CONTINUE".
   Press S/S to enter the Test and Calibration Menu.
3) Once the Test and Calibration Menu is displayed pressing and releasing the TS/C key will cause the various menu options to be displayed.
4) Check that the following options are displayed:
   1. CALIBRATE HEATER
   2. TEST HEATER LINEARITY
   3. BURN-IN TEST
   4. TEST SENSORS
   5. BUFFALO (This is for software debug)
   6. TEST VALVE
   7 ADJUST PUMP SPEED
   8 RETURN TO MAIN PROGRAM
5) Press S/S key to select the ***RETURN TO MAIN PROGRAM*** option. Turn off power.
6) The Operator Options Menu may be entered manually if both keys are held down during power application until the display is initialized then release.
7) Once the Operator Options Menu is displayed pressing and releasing the TS/C key will cause the various menu options to be displayed.
8) Check that the following options are displayed:
   1. LANGUAGE, LANGUE, SPRACHE, LENGUAJE
   2. SET PARAMETERS TO DEFAULT
   3. ADJUST ALARM VOLUME
   4. ENABLE/DISABLE KEY BEEP
   5. ADJUST PURGE TIME
   6. RETURN TO MAIN PROGRAM

8.3 Heater Calibration and Linearity

1) Enter the Test and Calibration Menu. Using tape, secure the temperature meter probe to the Gel Holder. Locate the probe tip centered left to right and 2.5 inches down from the top of the Gel Holder. Attach a blank Gel Plate and install the holder in the instrument. Insure that the probe tip does not touch any surface.
2) Select the option ***CALIBRATE HEATER*** and press S/S. If calibration has been previously done, a back-up calibration is detected and the option to press TS/C to restore calibration is displayed. Press S/S to decline.

3) Insure that the blower starts to run.
4) The target temperature to which the heater is being driven will be displayed along with the current D/A and A/D values. Allow sufficient time for the temperature to stabilize before making adjustments. Once the temperature meter indication has stabilized, adjust the meter temperature to the target value by pressing and releasing the TS/C key to increase or the S/S key to decrease the programming D/A. Once the temperature meter indication is correct, watch the D/A display value to insure that it doesn't change while pressing both keys simultaneously to accept the low temperature calibration.
5) The target temperature and D/A value will be increased. Adjust the temperature to the target value displayed. Press both keys to accept the high temperature calibration.
Note: If the temperature will not reach 70 degrees at the maximum D/A setting it may be necessary to slightly reposition the instrument's temperature sensor (LM335) away from the heater element.
6) (Test of restoration of Calibration will be verified in the next steps where linearity is tested after restoration). Re-select CALIBRATE HEATER, this time the option to restore the calibration is presented, press TS/C to restore when the option is presented.
7) The display will return to the Test and Calibration Menu. Select ***TEST HEATER LINEARITY.***
8) Record the measurements required on the form provided with this instruction. Allow the temperature to stabilize before taking readings. Press TS/C to cause the next temperature to be programmed. This record is to be retained as evidence in the History Folder.
9) Select ***RETURN TO MAIN MENU.***

8.4 Test of Valve Positioning:

1) Enter the Test and Calibration Menu. Select the ***TEST VALVE*** option.
2) The display will appear as follows:
'(continue)CHANGE (start)SET (both)QUIT'' POSITION = d
The TS/C key will change the target Valve position.
The S/S key will cause the selected valve to be actuated .Both keys simultaneously pressed will exit this test.
4) Using the TS/C key select each position in turn, enter S/S causing the Valve to be positioned to the port selected. Place a rep prepper (small rubber squeeze bulb) in each corresponding port in turn (valve1-7) and squeeze the bulb to blow air. When the corresponding valve is open, air should flow freely. For port 8, disconnect tubing from the recirculation port (upper left side of stainer chamber). Attach squeeze bulb to tube. Again when the corresponding vale is selected, air should flow freely. Replace tubing when finished.
5) When all seven positions have been tested, end the test by pressing both keys simultaneously.
6) Reconnect the tubing to the Pump.

8.5 Test of Sensors

1) Enter the Test and Calibration Menu. Select ***SENSOR TEST***.
2) The display will appear as follows:
START TEST VAT_LO VAT_HI WASTE EYE
0/1 0/1 0/1 0/1 0/1 0/1
3) START will be 0 when S/S not pressed and will be 1 when pressed.
4) TEST will be 0 when TS/C not pressed and will be 1 when pressed.
5) Connect a five gallon container to the waste port.
VAT_LO will be 0 when no fluid and will be 1 when fluid is detected. Test this by putting enough D.I. water into the chamber to cover the lower sensor. The reading should go to 1.
6) VAT_HI will be 0 when no fluid and will be 1 when fluid is detected. Test this by putting enough D.I. water into the chamber to cover the upper sensor. The reading should go to 1.
7) WASTE will be 1 when a shorting plug is installed in the connector and will be 0 when the shorting plug is removed.
8) EYE will be 0 when the Gel Holder is removed and will be 1 when the holder is installed.
9) Press both keys simultaneously to return to the Test and Calibration Menu.

8.6 Calibrate Pump Motor speeds.

1) Enter the Test and Calibration Menu. Select the ***ADJUST PUMP SPEED*** option.
2) The display should appear as follows:
(continue)NEXT (start)FILL (both)EXIT
3) Pressing TS/C, selecting NEXT, will cause the display to appear as follows:
(continue)NEXT (start)PURGE (both)EXIT
4) Pressing TS/C, selecting NEXT, will cause the display to appear as follows:
(continue)NEXT (start)RECIR. (both)EXIT
5) Pressing TS/C, selecting NEXT, will cause the display to return to the first option of step 2) and appear as follows:
(continue)NEXT (start)FILL (both)EXIT
6) Calibrate FILL speed.
Pressing S/S, selecting FILL, will cause the display to appear as follows:
(continue)ADJUST (start)RUN (both)EXIT'
7) Pressing TS/C, selecting ADJUST, will cause the display to appear as follows:
(continue)DEC. (start)INC. (both)EXIT
'ELAPSE TIME = d.ddd SECS. D/A = dd'
8) Verify that the D/A value displayed may be adjusted by means of the TS/C and S/S keys.
9) If this is the first calibration set the D/A for an initial value of 130.Pressing both keys simultaneously will cause the display to return to that of step 6 Press S/S, selecting RUN, causing the Chamber to be filled to the upper sensor then evacuated to the Waste port.

10) Again press TS/C selecting ADJUST. Observe the elapse time which was required to fill the Chamber. This time is to be adjusted as near as possible to 12.5 seconds. The acceptable range is 9 to 14 seconds. Repeat step 9 and 10) adjusting the D/A as necessary, filling the Chamber and observing the elapse time. Once this has been adjusted record the Elapse time and the D/A setting using the Calibration Check Off Sheet included Press and release both keys simultaneously as necessary to cause the display to appears as follows:
(continue)NEXT (start)PURGE (both)EXIT

11) Calibrate PURGE speed.
Pressing Start, selecting PURGE, will cause the display to appear as follows:
(continue)ADJUST (start) RUN (both)EXIT

12) Remove the tubing from the Waste port to the Waste Vat.
Connect a piece of tubing from the Waste port to a graduated cylinder having a measuring range of 100 mL.

13) If this is the first calibration set the D/A for an initial value of 125
Repeating the previous procedure to ADJUST the D/A, RUN the pump and observe the volume of fluid discharged into the graduated cylinder.
The D/A is to be adjusted so that the fixed 3 second fill time results in a discharge volume of 45 to 65 mL. Once this has been adjusted record the Volume measured and the D/A setting using the Calibration Check Off Sheet included. Press and release both keys simultaneously as necessary to cause the display to appears as follows:
(continue)NEXT (start)RECIR. (both)EXIT

14) Calibrate RECIRCULATION speed.
Pressing S/S, selecting RECIR. will cause the display to appear as follows:
(continue)ADJUST (start)RUN (both)EXIT'

15) Pressing TS/C, selecting ADJUST, will cause the display to appear as follows:
(continue)DEC. (start)INC. (both)EXIT
'ELAPSE TIME = d.ddd SECS. D/A = dd'

16) Verify that the D/A value displayed may be adjusted by means of the TS/C and S/S keys.

17) If this is the first calibration set the D/A for an initial value of 70. Pressing both keys simultaneously will cause the display to return to that of step 14.
Press S/S, selecting RUN, causing the Chamber to be filled to the upper sensor then evacuated to the Waste port using the D/A value selected to control the pump speed during evacuation.

18) Again press TS/C selecting ADJUST. Observe the elapse time which was required to evacuate the Chamber. This time is to be adjusted as near as possible to 20 seconds. Repeat the previous steps adjusting the D/A as necessary, filling and evacuating the Chamber and observing the elapse time. Once this has been adjusted record the Elapse time and the D/A setting using the Calibration Check Off Sheet.

19) Press and release both keys simultaneously as necessary to cause the next item of the Test and Calibration Menu to be displayed.

8.7 Test of Parameter Programming

NOTE: Operation of edit.

The test to be programmed is selected by pressing and releasing the TS/C key until the test desired is displayed. The EDIT MODE is entered by pressing both keys simultaneously The option to Read or Edit is presented. Selecting Read will cause the first operation to be displayed, then pressing either key will cause the remaining operations to be displayed. Selecting Edit will cause the first operation and it's parameters to be displayed. To edit the operation or it's parameters, press any key for 1/2 second, a Beep will be heard. The underscore will indicate the parameter currently available to be modified. To accept or leave unchanged the parameter at the underscore and to move the underscore to the next parameter, press the S/S key for 1/2 second, a Beep will be heard. To accept or leave unchanged the parameter at the underscore and to move the underscore to the previous parameter, press the TS/C key for 1/2 second, a Beep will be heard. Change the parameter at the underscore, by pressing the S/S or the TS/C key, for less than 1/2 second, to increment or decrement the parameter indicated. Finally, selecting the END OF TEST operation and pressing the S/S key for 1/2 second, a Beep will be heard, ends the editing.

1) Test of the prompt options. Select the test LIPO. Enter the EDIT MODE. Insure that the PROMPTS include:
(NOTE: the order isn't important)
1. NO PROMPT
2. PLATE OUT, GEL HOLDER IN, PRESS(continue)
3. PLATE IN, GEL HOLDER IN, PRESS(continue)

2) Test of OPERATIONS options. Review the TEST OPERATIONS options. Insure that the operations include:
(NOTE: the order isn't important)
1. WASH
2. END OF TEST
3. DRY
4. DESTAIN
5. STAIN

3) Test of the range of TIME values which may be programmed. Select the DRY operation. Move the underscore to the time display area. Use the TS/C key to decrease the time and the S/S key to increase the time. Verify the maximum and minimum times which may be programmed. (Maximum time is 99:59, minimum time is: 01).

4) Test of programmable TEMPERATURE range. Move the underscore to temperature display area. Use the TS/C key to decrease the temperature and the S/S key to increase the temperature. Determine the maximum and minimum temperatures which may be programmed.(maximum temperature is 70, minimum temperature is 30 degrees C).

5) Test of the RECIRCULATION options.
Select the WASH operation is selected. Move the underscore to the Recirculation display area. Use the SELECT key to display the options.

The options are:
1. REC = ON
2. REC = OFF
3. REC = REV

6) Test of the valve selection programming range. Move the underscore to the valve display area. Use the TS/C key to decrease the valve number and the S/S key to increase the valve number. Determine the maximum and minimum valve selections which may be programmed. VALVE= 1 through 3, 5 and 7.

7) Set the operation to END OF TEST and press the S/S until the beep is heard, to save the edits and end editing this test.

8) Turn off the power. Press the both keys simultaneously and turn the power on. Once the display has initialized release the keys. This will access the Operator Option Menu.

9) Select the option ***"SET PARAMETERS TO DEFAULT".***
For each test name the display will appear as follows:
'TEST NAME'
'(continue) ENABLE TEST OR (stop) DISABLE TEST'
enter TS/C to enable to include the test's name in the Test Name Menu and the display will then appear as follows:
'(continue) SET TO DEFAULT (start) NO CHANGE'
enter TS/C to enable each test and to set each test to default value

8.8 Test select display language option.

1) Using the TS/C keys verifies that the menu includes the following:
LANGUAGE, LANGUE, SPRACHE, LENGUAJE
SET PARAMETERS TO DEFAULT
ADJUST ALARM VOLUME
ENABLE/DISABLE KEY BEEP
ADJUST PURGE TIME
RETURN TO MAIN PROGRAM

2) Select and execute the **LANGUAGE, LANGUE, SPRACHE, LENGUAJE** option.

3) The bottom line of the display will appear as follows:
ENGLISH FRANCAIS DEUTSCH ESPANOL
with the cursor blinking at the selected language.

4) Press either key to cause the cursor to move indicating the current choice.

5) Pressing both keys simultaneously will cause the language indicated to be set as the choice for displaying the Operator messages, not the Technical messages.

8.9 Test Alarm and Key Beep:

1) Enter the Operator Option Menu. .Select ***ADJUST ALARM VOLUME*** The display is as follows:

'(ts/c)↓ (s/s) ↑QUIT (both)'
' d'
Where d is a value in the range of 1 to 36.
The alarm volume is adjusted by pressing the TS/C key to decrease the volume or the S/S key to increase the volume. Releasing the keys will cause the current selection to be demonstrated. Cycle through the volume range verifying that each numeric change results in volume change. Set the volume to midrange (18). The selected value will be stored in EEPROM when both keys are pressed simultaneously. The selection will end and the display will return to the next item of the Operator Selections Menu.
Return to the Main Menu, and start a Serum Protein test. When the test begins press the S/S key. Insure alarm sounds. Press the indicated key to return to the Standby mode.

2) Enter the Operator Option Menu. Select ***ENABLE/DISABLE KEY BEEP***. Set to Disable. Enter the main program and verify that the Beeper does not sound when a key is entered. Again enter the Operator Option Menu this time select and enable the Key Beep. Enter the main program and verify that the Beeper sounds when a key is entered.

8.10 Purge Time Test

1) Enter the Operator Option Menu. Select ***ADJUST PURGE TIME***. The display should appear as follows:
'DEFAULT TIME (continue), ADJUST (start)'

2) Press TS/C to select Default Purge time. The display will return to the first of the Operator Option Menu. Again select ***ADJUST PURGE TIME*** this time press S/S to select ADJUST. Insure that the displayed appears as follows and that the time initially displayed is the 3 seconds default time previously set.
'ADJ. PURGE TIME UP (continue), DOWN (start)''d Sec.'

3) Insure that the TS/C and S/S keys will cause the d value displayed to change from 0 through 5 seconds.

4) Select 0 seconds and enter the Main Program, select Serum Protein. Start the test, note that the first operation is FILLING, Purging does not occur. Abort the test.

5) Repeat this procedure this time setting the Purge time for 5 seconds .Note that when the test is started the first operation is PURGING, Stain will be drawn into the chamber for 5 seconds then the Stain is dumped to the Waste Vat. The chamber is then filled with Stain and at the end of the Stain operation the Stain is returned to the Stain Vat.

6) Program the Purge time to 3 seconds which is the default value.

8.11 Fluid Fill and Drain Functional Test

WARNING: The Stainer's pumps are not designed to run dry. The pumps may be run for a short period if the internal pump cavity is wetted during priming. The end of the fluid pickup tubes should not be lower than the pumps priming to be successful.

1) Install the Gel Holder (with a blank Gel Plate attached) into the Gel Chamber. Insure that the Waste Vat cable is attached between the Waste Vat and the connector on the rear of the instrument or that a shorting plug is installed in the connector.

2) Select the LIPO test and program it as follows:
NO PROMPT
WASH 1 :15 REC = ON VALVE= 1
NO PROMPT
STAIN 1 :15 REC = OFF VALVE= 3
NO PROMPT
DESTAIN 1 :15 REC = ON VALVE= 2
NO PROMPT
END OF TEST

3) **NOTE: Make sure the fluid is passing through the correct valve ports which are programmed.** Start the test.
(NOTE the display format mm:ss represents the operation timer display)
The display reads:
'WASH 1'
'(continue) NEXT STEP (start) START RUN'
Press S/S
The display reads 'WASH 1'
'<FILLING> mm:ss'
The fill pump will pump from the wash vat into the gel chamber through valve port programmed. The operation ends.

4) The display reads:
'WASH 1'
'<RECIRCULATION ON> mm:ss'
The recirculation pump runs.
The operation time expires.

5) The display reads:
'WASH 1
'<DRAINING> mm:ss'
The chamber is drained through the Waste port. The operation time expires.

6) This sequence will be repeated for Stain with the exception that Stain will be purged and dumped to the waste then filled and returned to the Stain vat.

7) This Destain operation will be the same as the Wash operation except for the valve port used during filling.

8) When the display reads
'FINISHED'
'PLATE OUT, GEL HOLDER IN,PRESS(continue)'
The Alarm is switched on and off.
Press the TS/C key. Note that the alarm stops but the instrument will not go to the Standby mode.

COPY

9) Remove the Gel Holder. In approximately 3 seconds the display returns to the STANDBY mode which is to display the test name only (on the top line), and the pump is again filled.

10) Inspect the internal fluid paths for any leaks. See that the fluid has been removed from the chamber.

11) Edit a test to have three WASH operations. Set the Recirculation OFF for the first WASH. Set the Recirculation ON for the second WASH. Set the Recirculation REV for the third WASH. Remove the Gel Holder and block the Gel Holder Detector. Run the test programmed. The test which was previously ran contained a Stain operation, this test does not include a Stain operation therefore prior to performing the scripted operations, the instrument will proceed to clean the chamber as follows:
The prompt "PLATE OUT, GEL HOLDER IN" is displayed. Once the prompt has been acknowledged four each one minute WASH operations are perform with recirculation ON, using fluid from port 7.The prompt "PLATE IN, GEL HOLDER IN" is then displayed. Once the prompt has been acknowledged the programmed test may be ~~is~~ performed. Note that fluid is not circulated in the chamber during the first WASH, fluid is circulated into the top port of the chamber during the second WASH, and finally that fluid is circulated into the bottom port of the chamber during the third WASH.

8.12 Gel Chamber Fluid Level Sensor Tests:

NOTE: **The Gel Chamber should fill with enough D.I. water to be more than empty but not full. This should be detected by each of the fluid detectors located at the top and bottom of the Chamber**.

1) Select the LIPO Test. Press the S/S key. The display indicates that the pump is being drained then the display reads:
'WASH 1'
'(continue) NEXT STEP (start) START RUN'
Press the S/S key.
The display reads:
'WASH 1'
'<FILLING> :15'
When the timer counts down to 8 seconds, tilt the fluid vat (to allow air to reach the pickup tube inside the vat), until the fill timer reaches zero.

2) The alarm should sound and the display reads:
' UPPER SENSOR FAILURE'
'(continue) CONTINUE (stop) ABORT'

3) Press the S/S key. Once initialization is complete the display should read:
'PLEASE WAIT.'
'TRYING TO CORRECT THE PROBLEM'

4) The chamber is evacuated to the waste port such that the fluid is below the recirculation top port. The recirculation line is then evacuated to the bottom of the Chamber. Finally the Chamber is completely evacuated to the waste port.

5) When the drain time reaches zero the display should indicated that the instrument has return to the standby mode, displaying the test name of the first enabled test on the top line, and the pump will again be filled.

8.13 Waste Vat Full and Gel Holder Missing Sensor Tests:

1) Unplug one end of the cable between the waste vat and the connector jack on the rear of the instrument (or remove shorting plug) to simulate a waste vat full condition.
2) Press the S/S key twice . The alarm sounds and the display reads:
' WASTE VAT NEEDS TO BE DRAINED'
'(continue) CONTINUE (stop) ABORT'
3) Reconnect the waste vat cable to the instrument. Press the S/S key to remove the error condition.
4) Remove the Gel Holder and press the S/S key twice. The display reads:
' GEL HOLDER MISSING'
'(continue) CONTINUE (stop) ABORT'
5) Install the Gel Holder and press the S/S key to clear the error.

8.14 Burn-In Test: **Incubator**

NOTE: During Test the cycles remaining will be displayed.

1) Turn off power; connect the dummy 20 K 10 watt load to the test jacks on the rear of the instrument. Install a pair of Spreader Bars inboard of the Electrode posts. Install a clean mylar plate on the chamber floor to protect the patch from wear. Install a Reagent bottle. Set the Reagent Detect option to ON and the Positive Patient ID option to OFF. Close the lid and enter the main program.
2) Program the Serum Protein Parameters as follows:
(ALL NO PROMPTS)

LOAD SAMPLE 30 seconds 21 degrees C, SPEED 1
APPLY SAMPLE 30 seconds 21 degrees C, SPEED 1
ELECTROPHORESIS 3 minutes, 21 degrees C at 300 volts 20mA
APPLY REAGENT, 40 degrees, 10 CYCLES
ABSORB 3 minutes, 24 degrees C
INCUBATE 3 minutes 28 degrees C
BLOT 3 minutes, 32 degrees C
DRY 3 minutes, 54 degrees C.
END OF TEST.

3) There will be 78 cycles ran.

8.15 Burn-in Cycle: **Stainer**

1) Edit the SERUM PROTEIN test as follows:
(ALL NO PROMPTS)
STAIN 1 :20 REC= ON VALVE= 1
DRY 1 5:00 60 DEGREES

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STAIN 2 :20 REC= ON VALVE= 2
DRY 2 5:00 60 DEGREES
STAIN 3 :20 REC= ON VALVE= 3
DRY 3 5:00 60 DEGREES
STAIN 4 :20 REC= ON VALVE= 5
DRY 4 5:00 60 DEGREES
STAIN 5 :20 REC= ON VALVE= 7
DRY 5 5:00 60 DEGREES
STAIN 6 :20 REC= ON VALVE= 1
DRY 6 5:00 60 DEGREES
END OF TEST

2) Set Purge Time to 0 seconds.
3) Connect a separate D.I water filled vat to each of the six supply ports (1, 2, 3, 5, 7,) Mark the fluid level of each vat. Connect the Waste port to the port 7 vat to recover the Pump Wetting fluid discharged. The Gel Holder (with a blank gel) must be installed in the chamber. The Waste sensor must be shorted. Record BURN-IN start time and date on the calibration check off sheet.
4) This test will perform 39 cycles using the SERUM PROTEIN parameters.
5) The remaining cycles count is displayed after the current operation name.
6) If an error occurs the machine will stop, displaying the error.
7) Enter the Test and Calibration Menu, and select BURN-IN.
8) If the machine completes the test with no errors, both displays will indicate: "BURN-IN TEST COMPLETED" and the software locks up. Since all operations on stainer assembly were Stain, the fluid will be returned to the supply vat. In each case, check to insure that the fluid levels are approximately as originally marked. The power must be cycled off and on to initialize the instrument. Record BURN-IN stop time and date on the calibration check off sheet.
9) Go to the Operator Options Menu and perform the restore of all DEFAULT PARAMETERS on both sides and set PURGE TIME to default value of 3seconds. Set Positive Patient I.D. to OFF and Reagent Detector to ON.

8.16 Leakage Current Test:

1) Perform the leakage current test according to 8R700021, record the results in the instrument history folder.

9.0 Final Test

1) Record software Ver. and Rom Sum on History Data sheet. Insure Pretest, and burn-in sections are complete with Tech. I.D., date and problems. Final test section will be completed after buddy check. Finish Serial Number Record page as necessary. Insure Manufacturing Problem Log is complete. Insure Tech. I.D. number, Workorder number, and date are on each check off sheet. Fill in all Volt and Temp. Meter I.D. numbers where required. Insure Machine Serial Numbers is filled in on check off sheets when applicable.
2) Record the software version number on the Buddy Check Sheet.
3) Apply glyptal to the potentiometer on each of the front switches.

4) Have uncovered visuals performed and recorded by another tech. and a Supervisor/Lead.
5) Install the shell enclosure and sled shell per print (8IE54101).
6) Adjust switches so that they are flush with the front of the shell enclosure.
7) Apply appliqués per print(8IE54101). Insure proper function of switches.
8) Insure proper alignment of sled per step 7.11.5.
9) Insure proper alignment of interlock switch per step 7.23.
10) Have buddy check performed and recorded by another tech. or Supervisor/Lead.
11) Complete MRP moves and submit instrument to QA.

10.0 Handling of Returned Instruments:

CAUTION: **Returned equipment may have electrical defects that could be hazardous when the device is connected to an AC outlet.**

1) Decontaminate the unit in accordance with S.O.I. 14-0058.
2) Ensure the units "Reason of Return" is investigated and documented in accordance with 8R690007.
3) Remove the top cover and inspect the inside of the unit for fluid leakage and clean out as necessary. Inspect the wiring and ground connections.
4) Visually inspect all PCBs for damage, signs of heating, and broken or damaged components.
5) While reworking the unit, perform all the necessary ECOs on the unit, PCBs, and assemblies in accordance with the ECO TRACKING CHART. Bring all required out of date assemblies up to the required revision and document the change in the history folder.
6) Replace all silicone tubing.
7) Inspect all covers and panels and replace as required.
8) Begin Test and Calibration from page 1 of this procedure.

11.0 **Installation Test Procedure (INCUBATOR):** (for Service Reps only)

11.1 Test EP. Supply:

NOTE: **The hinged Lid which covers the Electrophoresis Chamber actuates a dual high voltage interlock which will disconnect the EP. Supply from the Electrode posts within the Electrophoresis Chamber and a switch which will disable the EP. Supply when the Lid is raised, HOWEVER the Red and Black banana jacks located on the rear chassis are NOT disconnected from the Electrophoresis Supply when the Lid is opened.**

NOTE: When testing the Electrophoresis Power Supply, whenever the display prompts to change the Dummy Calibration Load configuration the EP Supply will be disabled, however for the sake of SAFETY it is recommend that:

1) The Chamber Lid be opened to insure the EP. Supply is disabled.
2) The DVM must be observed to insure that the voltage is at a SAFE level before touching the test leads connected to the Dummy Load or the SPIFE banana jacks.

1) Enter the Test and Calibration Menu by means of pressing both keys, turn on the Main Power Switch, once the display is initialized release the keys and press the S/S key and release it.
2) Using the TS/C key scroll through the options until the option TEST HI VOLT LINEARITY is displayed, press the S/S key.
3) The display will prompt to connect the Calb. Load and press (continue) when completed.
4) Configure the Dummy Load for voltage measurement, insert a second DVM, set to measure 300mA, in series between the input red jack of the Dummy load and the red banana jack on the rear panel, once the load is connected press TS/C.
5) Record the voltage and current values of the display and DVMs using the Record sheet provided in this instruction.
6) Press TS/C after each measurement to cause the next value to be displayed. The display will return to the selection menu when test is completed

11.2 Test Chamber Temperature:

1) Using thermal compound and aluminum tape secure the temperature meter probe to the Chamber floor in a manner that insures good thermal contact between the probe and the Chamber floor, paper towels rolled and placed over the probe and a test chamber lid may be installed to both insulate and force the probe into intimate contact with the chamber floor.
2) Enter the Test and Calibration Menu by means of pressing both keys, turn on the Main Power Switch, once the display is initialized release the keys and press the S/S key and release it.
3) Using the TS/C key scroll through the options until the option TEST CHAMBER TEMP. LINEARITY TEST is displayed, press the S/S key.
4) Allow temperature to stabilize before taking reading, Record the measurements required on the Record sheet provided with this instruction.
5) Press TS/C key to cause the next temperature to be programmed. The display will return to the selection menu when test is completed

11.3 Test Applicator Alignment:

Refer to the note in section 7.11 describing the operation of the TEST APPLICATOR DRIVE test to be used.
Refer to section 7.10 and 7.11 for alignment instructions if necessary.

1) Install a sample tray. Install the appropriate applicator blades in the appropriate slots. Install the Reagent Spreader Bars.
2) Enter the Test and Calibration Menu by means of pressing both keys, turn on the Main Power Switch, once the display is initialized release the keys and press the S/S key and release it.
3) Using the TS/C key scroll through the options until TEST APPLICATOR DRIVE is displayed, press the S/S key.
4) Select SLED drive, set MOVE TO POSITION to 8 and command RUN.
5) Set MOVE TO POSITION to 1 and command RUN.
6) Select APPLICATOR drive, set MOVE TO POSITION to 2 and command RUN.

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7) Insure that all Applicator blades touch the bottom of the sample cups and are centered within the sample cups, the blades must not touch the Sample Well wall. If realignment is necessary refer to section 7.11
8) Set MOVE TO POSITION to 0 and command RUN. The Applicator is raised to the Home position.
9) Select SLED drive, set MOVE TO POSITION to 5 and command RUN.
10) Select APPLICATOR drive, set MOVE TO POSITION to 2 and command RUN.
11) Insure that when the Applicator is driven down all Applicator Blades are touching the Chamber floor as indicated by the fact that all are slightly lifted above the top of the Blade Holder.
12) Set MOVE TO POSITION to 1 and command RUN.
13) Insure that when the Applicator is raised and then driven back down that the Reagent Spreader Forks will engage the spreader properly and that the Applicator Blades do not touch the Chamber floor.
14) Press and release both keys until the display returns to the selection menu. Refer to section 7.10 for instructions regarding the measurement off the applicator and sled speeds.
15) Refer to section 7.11 for instructions regarding the testing of the Reagent Drive.
16) Refer to section 7.9 regarding the testing of the Detector switches.
17) To end testing press and release both keys until the display returns to the first of the Test and Calibration Menu.

11.4 Test Applicator Speeds:
Refer to section 7.10 to test and calibrate if necessary the speeds of the Applicator and Sled.

12.0 Installation Test Procedure (STAINER): (for Service Rep Only)

12.1) Test Dryer temperature calibration:
1) Using tape, secure the temperature meter probe to the Gel Holder. Locate the probe tip centered left to right and 2.5 inches down from the top of the Gel Holder. Do not allow Probe tip to touch the holder. Attach a blank Gel Plate and install the holder in the instrument.
2) Enter the Test and Calibration Menu by means of pressing both keys, turn on the Main Power Switch, once the display is initialized release the keys and press the S/S key and release it
3) Using the TS/C key scroll through the options until the option ***TEST HEATER LINEARITY*** is displayed, press the S/S key.
4) Allow the temperature to stabilize before taking readings. Record the measurements required on the form provided with this instruction .Press TS/C key to cause the next temperature to be programmed. The display will return to the selection menu when test is completed

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12.2 Test fluid handling:
Refer to section Fluid Fill and Drain Functional Test. Perform all steps of this section.

12.3 Operational Test:
Perform an Electrophoresis test. Refer to the appropriate Customer Procedure.

13.0 Preventive Maintenance (Service Only)

13.1 Indicate the completion of each step of the Preventive Maintenance on the attached Annual PM Sheet.

ELEC- COPY

Tech # _____
Work Order # _____
Date _____

SPIFE 3000 Test Record

Machine Serial Number_____
Temp. meter I.D. #_____
Voltmeter I.D. #(s)_____

7.3.1 _____ Hypot Test

7.3.2 _____ Continuity test max 5 OHM

7.4 Power Supply Test

7.4.1 _____V (+4.75 to +5.25 Volts) 7.4.5_____V (+4.75 to +5.25 Volts)

7.4.2 _____V (+11.64 to +12.36 Volts) 7.4.6_____V(+11.64 to +12.36 Volts)

7.4.3 _____V (-4.75 to -5.25 Volts) 7.4.7_____V(-4.75 to -5.25 Volts)

7.4.4 _____V (-11.64 to -12.36 Volts) 7.4.8_____V(-11.64 to -12.36 Volts)

7.5.13 **Electrophoresis Supply Voltage Linearity**

Target	Monitor	Meter	Monitor	Meter
100 volts ± 2%	_____volts	_____volts	_____mA.	____mA.
200 volts ± 2%	_____volts	_____volts	_____mA.	____mA.
300 volts ± 2%	_____volts	_____volts	_____mA.	____mA.
400 volts ± 2%	_____volts	_____volts	_____mA.	____mA.
500 volts ± 2%	_____volts	_____volts	_____mA.	____mA.
600 volts ± 2%	_____volts	_____volts	_____mA.	____mA.
700 volts ± 2%	_____volts	_____volts	_____mA.	____mA.
800 volts ± 2%	_____volts	_____volts	_____mA.	____mA.
900 volts ± 2%	_____volts	_____volts	_____mA.	____mA.
1000 volts ± 2%	_____volts	_____volts	_____mA.	____mA.
1100 volts ± 2%	_____volts	_____volts	_____mA.	____mA.
1200 volts ± 2%	_____volts	_____volts	_____mA.	____mA.
1300 volts ± 2%	_____volts	_____volts	_____mA.	____mA.

FILE COPY

Tech # _____
Work Order # _____
Date _____

7.6.12 **Chamber Temperature Linearity**

Target	Monitor	Meter	TEC I.
10 ± 1.5 deg.C	_____deg.C	_____deg.C	____Amps
20 ± 1.5 deg.C	_____deg.C	_____deg.C	____Amps
30 ± 1.5 deg.C	_____deg.C	_____deg.C	____Amps
40 ± 1.5 deg.C	_____deg.C	_____deg.C	____Amps
50 ± 1.5 deg.C	_____deg.C	_____deg.C	____Amps
62 ± 1.5 deg.C	_____deg.C	_____deg.C	____Amps

7.7 **Chamber Thermostat**

Trip_____deg.C
Reset_____deg.C

7.8.3 **Calibrate the Reagent Detector**

Bottle out ____ in ____ calibration value ____

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Tech # _____
Work Order # _____
Date _____

7.10.2 **Sled Calibration Data**

		Elapse Time	D/A	Acceptable Range ±15%
Sled Speed	# 1	_____	_____	1.7 to 2.3 secs.
Sled Speed	# 2	_____	_____	3.4 to 4.6 secs..

Applicator Calibration Data

	Elapse Time	D/A	Acceptable Range ± 3%
Applicator Speed # 1	_____	_____	1.287 to 1.367 secs.
Applicator Speed # 2	_____	_____	1.011 to 1.074 secs
Applicator Speed # 3	_____	_____	.829 to .881 secs
Applicator Speed # 4	_____	_____	.704 to .748 secs.
Applicator Speed # 5	_____	_____	.613 to .651 secs.
Applicator Speed # 6	_____	_____	.432 to .458 secs.
Applicator Speed # 7	_____	_____	.829 to .881 secs.
			Acceptable Range ±15%
Applicator Speed # 8	_____	_____	28 to 37.9 secs.

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Tech # _____
Work Order # _____
Date _____

7.12.2 **Test Dwell Times**

#1 _____ secs.

#2 _____ secs.

#3 _____ secs.

#4 _____ secs.

#5 _____ secs.

#6 _____ secs.

#7 _____ secs.

#8 _____ secs.

ELAPSE TIME _____ secs.

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Tech # _____
Work Order # _____
Date _____

Spife Test Buddy Check Sheet - Incubator

Machine Serial_____

Software Version number: _____

Include the Tech. I.D. # as each item is approved.

7.1 Align and level Chamber: _____

7.2 Electrophoresis Interlock test: _____

7.9 Test Detector switches: _____

7.11 Align, Adjust and Test Applicator, Sled and Reagent Drives: _____

7.13 Test of Bar Code Reader: _____

7.14 Test of Parameter Editing: _____

7.15 Fan Test: _____

7.16 Test Select Display Language Option _____

7.17 Test Set Parameters to Default: _____

7.18 Adjust Alarm Volume: _____

7.19 Test Enable/Disable Key Beep: _____

7.20 Test Enable/Disable Positive Patient ID: _____

7.21 Test Enable/Disable Reagent Detect: _____

7.23 EP Interlock Alignment: _____

Unit Appearance_____

Fuses_____

Hardware_____

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Tech # _____
Work Order # _____
Date _____
Stop Watch # _____

7.22 Spife Heat Load Test 1 **Time started:_____**

Time in Mins.	Block Temp. °C	Load Temp. °C	TEC Amps	Room Temp. °C
0				
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

7.22 Spife Heat Load Test 2 **Time started:_____**

Time in Mins.	Block Temp. °C	Load Temp. °C	TEC Amps	Room Temp. °C
0				
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

Peak TEC Current (xx Cool) _____Amps.

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SPIFE CALIBRATION CHECK OFF SHEET

Work Order #_____ Tech_____

Date_____

Temp. meter ID._____

Heater Temperature Linearity: Readings must be within + or - 1.5 degrees

8.3.7 Target	Monitor	Meter
30 deg.C	_____ deg.C	_____ deg. C
40 deg.C	_____ deg.C	_____ deg. C
50 deg.C	_____ deg.C	_____ deg. C
60 deg.C	_____ deg.C	_____ deg. C
70 deg.C	_____ deg.C	_____ deg. C

8.6.10 Calibration of Pump speed for FILL Elapse Time _____D/A_____

8.6.13 Calibration of Pump speed for PURGE Elapse Time _____ D/A_____

8.6.18 Calib. of Pump speed for RECIRCULATION Elapse Time _____D/A_____

8.15.3 Burn in start time and date _____

8.15.8 Burn in stop time and date _____

8.16 Leakage Current (MA) Normal _____ Reverse _____

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Buddy Check Sheet--Spife Stainer

Tech. # _____
Work Order # _____
Date #_____

Machine Serial _____

Software Version number _____

Include the Tech. I.D. # as each item is approved.

8.4 Test of Valve Positioning _____

8.5 Test of Sensors _____

8.7 Test of Parameter Programming and Default Setting _____

8.8 Test display language selection _____

8.9 Test Alarm and Key Beep _____

8.10 Purge Time Test _____

8.11 Fluid Fill and Drain Functional Test_____

8.12 Gel Chamber Fluid Level Sensor Tests _____

8.13 Waste Vat Full and Gel Holder Missing Sensor Tests _____

History folder complete _____

Tech _____ Date _____

Tech. Uncovered Visual _____ Date _____

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APPENDIX A

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SPIFE 3000 ANNUAL PM SHEET

Tech: _____
Date: _____

Machine Serial #: _____
Temp. Meter I.D.#: _____
Voltmeter I.D. # (s): _____

7.5.13 Electrophoresis Supply Voltage Linearity (mA ± 2)

Target	Monitor	Meter	Monitor	Meter
100 volts ± 2%	_____volts	_____volts	_____mA.	____mA.
200 volts ± 2%	_____volts	_____volts	_____mA.	____mA.
300 volts ± 2%	_____volts	_____volts	_____mA.	____mA.
400 volts ± 2%	_____volts	_____volts	_____mA.	____mA.
500 volts ± 2%	_____volts	_____volts	_____mA.	____mA.
600 volts ± 2%	_____volts	_____volts	_____mA.	____mA.
700 volts ± 2%	_____volts	_____volts	_____mA.	____mA.
800 volts ± 2%	_____volts	_____volts	_____mA.	____mA.
900 volts ± 2%	_____volts	_____volts	_____mA.	____mA.
1000 volts ± 2%	_____volts	_____volts	_____mA.	____mA.
1100 volts ± 2%	_____volts	_____volts	_____mA.	____mA.
1200 volts ± 2%	_____volts	_____volts	_____mA.	____mA.
1300 volts ± 2%	_____volts	_____volts	_____mA.	____mA.

7.6.12 Chamber Temperature Linearity

Target	Monitor	Meter	TEC I.
10 ± 1.5 deg.C	_____deg.C	_____deg.C	____Amps
20 ± 1.5 deg.C	_____deg.C	_____deg.C	____Amps
30 ± 1.5 deg.C	_____deg.C	_____deg.C	____Amps
40 ± 1.5 deg.C	_____deg.C	_____deg.C	____Amps
50 ± 1.5 deg.C	_____deg.C	_____deg.C	____Amps
62 ± 1.5 deg.C	_____deg.C	_____deg.C	____Amps

ELECTRONIC COPY

Tech: _____
Date: _____

Machine Serial #: _____

7.10.2 **Sled Calibration Data**

		Elapse Time	D/A	Acceptable Range ±15%
Sled Speed	# 1	_____	_____	1.7 to 2.3 secs.
Sled Speed	# 2	_____	_____	3.4 to 4.6 secs..

Applicator Calibration Data

	Elapse Time	D/A	Acceptable Range ± 3%
Applicator Speed # 1	_____	_____	1.287 to 1.367 secs.
Applicator Speed # 2	_____	_____	1.011 to 1.074 secs
Applicator Speed # 3	_____	_____	.829 to .881 secs
Applicator Speed # 4	_____	_____	.704 to .748 secs.
Applicator Speed # 5	_____	_____	.613 to .651 secs.
Applicator Speed # 6	_____	_____	.432 to .458 secs.
Applicator Speed # 7	_____	_____	.829 to .881 secs.
			Acceptable Range ±15%
Applicator Speed # 8	_____	_____	28 to 37.9 secs.

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8.3.7 Heater Temperature Linearity: Readings must be within + or - 1.5 degrees

Target	Monitor	Meter
30 deg.C	_____ deg.C	_____ deg. C
40 deg.C	_____ deg.C	_____ deg. C
50 deg.C	_____ deg.C	_____ deg. C
60 deg.C	_____ deg.C	_____ deg. C
70 deg.C	_____ deg.C	_____ deg. C

Tech: _____
Date: _____

Machine Serial #: _____

8.6.10 Calibration of Pump speed for FILL Elapse Time (13 sec ± .5 sec) _____D/A_____

8.6.13 Calibration of Pump speed for PURGE Elapse Time (45ml to 65ml) _____ D/A_____

8.6.18 Calib. of Pump speed for RECIRCULATION Elapse Time _____D/A_____

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